

What is claimed is:

1. A lithographic apparatus comprising:
  - a radiation system to provide a projection beam of radiation;
  - a support structure to support a patterning device, the patterning device constructed and arranged to pattern the projection beam according to a desired pattern;
  - a substrate table to hold a substrate;
  - a projection system to project the patterned beam onto a target portion of the substrate;said radiation system further comprising:
  - a beam delivery system comprising redirecting elements to redirect said beam from a radiation source to an illumination system wherein said radiation source is arranged to provide a beam having a predetermined polarization state and said redirecting elements are arranged to provide a minimum polarization related radiation loss.
2. A lithographic apparatus according to claim 1, wherein said redirecting elements are dielectric mirror elements and said beam is arranged to have an s-polarisation state relative to each of said mirror elements.
3. A lithographic apparatus according to claim 1, wherein said beam delivery system comprises at least one polarizing plate to modify a polarization state of said radiation beam.
4. A lithographic apparatus according to claim 3, wherein said polarizing plate is a half lambda plate.
5. A lithographic apparatus according to claim 3, wherein said polarizing plate is integral with one of said mirror elements.
6. A lithographic apparatus according to claim 5, wherein said polarizing plate is bonded to one of said mirror elements.
7. A lithographic apparatus according to claim 1, wherein each of said redirecting elements defines a plane of incidence, and wherein all planes of incidence of all redirecting elements are parallel to each other.

8. A mirror element comprising a dielectric reflective layer and a polarizing layer to provide a predetermined polarization state of a radiation beam relative to the reflective layer, the polarizing layer being integral with said dielectric reflective layer.
9. A mirror element according to claim 8, wherein said polarizing layer is a half lambda layer for light having a predetermined wavelength in the range of 248-127 nm.
10. A device manufacturing method comprising:
  - producing a beam of radiation having a predetermined polarization state;
  - directing the beam of radiation to an illumination system, the directing being performed such that polarization-related radiation losses are reduced;
  - patterning the beam of radiation according to a desired pattern; and
  - projecting the patterned beam of radiation onto at least a portion of a radiation sensitive layer on a substrate.
11. A method according to claim 10, the method further comprising arranging said beam to have an s-polarisation state relative to redirecting elements used in the directing.
12. A method according to claim 10, wherein the beam of radiation which is directed to the illumination system has a substantially square cross-section.
13. A beam delivery subsystem for use with a lithographic apparatus comprising:
  - a plurality of redirecting elements to redirect to direct a beam of radiation having a predetermined polarization state from a radiation source to an illumination system of the lithographic apparatus, the redirecting elements being arranged to provide a minimum polarization related radiation loss.
14. A beam delivery subsystem as in claim 13 wherein the beam and redirecting elements are mutually arranged such that the beam has a substantially s-polarization state relative to at least one of the redirecting elements.
15. A beam delivery subsystem as in claim 14 wherein the beam has a substantially s-polarization state relative to each of the redirecting elements.

16. A beam delivery subsystem as in claim 13 wherein the beam has a substantially square cross-section.

17. A method of manufacturing a lithographic apparatus employing radiation of a predetermined polarization state, comprising:

arranging a radiation system to provide a beam of radiation with said predetermined polarization state, the radiation system including dielectric mirror elements to redirect the beam from a radiation source and at least one polarizer to modify said radiation to an s-polarization state relative to the dielectric mirror elements.

18. A method according to claim 17, wherein the radiation system is constructed and arranged to produce the beam of radiation such that it has a substantially square cross-section.

19. A method according to claim 17, wherein the radiation system and mirror elements are mutually arranged such that the beam, when provided, has a substantially s-polarization state relative to at least one of the redirecting elements.

20. A method according to claim 19, wherein the beam, when provided, has a substantially s-polarization state relative to each of the redirecting elements.